VOL. VII. No. 17. AUGUST 18, 1910

THE JOURNAL OF PHILOSOPHY
PSYCHOLOGY AND SCIENTIFIC METHODS

HUXLEY'S EPIPHENOMENALISM: A CRITICISM AND AN APPRECIATION[1]

HUXLEY'S theory of the relation between mind and body receives little attention nowadays when parallelism and interactionism divide the field between themselves. It seems to be taken for granted by those who are unsympathetic with interactionism that parallelism is the only alternative, that Huxley's position is intelligible only as a step in the direction of parallelism, and that short of parallelism one may not stop when once this direction has been taken. It will be the attempt of this paper to show that while Huxley's theory is indefensible as it stands, it is capable of development into a view other than parallelism, and that this view is self-consistent and consistent with known facts. In my opinion, it is the most satisfactory working hypothesis at present available, and avoids the difficulties involved in interactionism and parallelism, but its apparent advantages over its rivals can not here be discussed. All I can do is, starting from Huxley's theory, to show what modification is necessary to arrive at this view, and why this modification is necessitated by the very logic of his position and made possible by a correct statement of facts an incorrect statement of which misled him into epiphenomenalism; and then I hope to remove some difficulties that may stand in the way of understanding the view thus developed.

To get Huxley's view before us exactly, I shall take the liberty of making rather long quotations from him. As his doctrine was an attempt to reconcile with the law of the conservation of energy the apparent fact that conscious processes[2] are effects of physical proc-

[1] A paper read at the meeting of the Western Philosophical Association at Iowa City, March 25, 1910. In view of the discussion that followed the reading, some passages have been rewritten for the sake of greater clearness.

[2] It is not necessary here to enter upon a discussion of Huxley's view of conscious processes or of how much he included under this term. Let it suffice to say that in general his doctrine of the relation between mind and body, with the modifications that I shall propose, is independent of any special view of the

esses in the brain, let us begin with his statement of the relation of conscious processes to that law.

"The doctrine of the conservation of energy which I have endeavored to illustrate is thus defined by the late Clerk Maxwell:

" 'The total energy of any body or system of bodies is a quantity which can neither be increased nor diminished by any mutual action of such bodies, though it may be transformed into any one of the forms of which energy is susceptible.' It follows that energy, like matter, is indestructible and ingenerable in nature. The phenomenal world, so far as it is material, expresses the evolution and involution of energy, its passage from the kinetic to the potential condition and back again. Wherever motion of matter takes place, that motion is effected at the expense of part of the total store of energy.

"Hence, as the phenomena exhibited by living beings, in so far as they are material, are all molar or molecular motions, these are included under the general law. A living body is a machine by which energy is transformed in the same sense as a steam-engine is so, and all its movements, molar and molecular, are to be accounted for by the energy which is supplied to it. The phenomena of consciousness which arise, along with certain transformations of energy, can not be interpolated in the series of these transformations, inasmuch as they are not motions to which the doctrine of the conservation of energy applies. And, for the same reason, they do not necessitate the using up of energy; a sensation has no mass and can not be conceived to be susceptible of movement. That a particular molecular motion does give rise to a state of consciousness is experimentally certain; but the how and the why of the process are just as inexplicable as in the case of the communication of kinetic energy by impact."[3]

Two things should be observed with regard to the conceptions that appear in this quotation. The one concerns the general conception of law and the other concerns the meaning of the particular law of causation. Scientific laws are for Huxley assumptions of order in the universe, borne out by experience. "All physical science starts from certain postulates. . . . The validity of these postulates is a problem of metaphysics; they are neither self-evident nor are they, strictly speaking, demonstrable. The justification of

nature of consciousness. All that the doctrine presupposes is that consciousness is not material. Huxley has a definition of matter which is given on page 60 of the work to be referred to in the next foot-note, but this definition again need not be accepted by one who holds to his general view of the relation between mind and body. All that is necessary is to conceive matter as occupying space and moving therein and existing in realistic and not idealistic fashion.

[3] *The Progress of Science*, in "Methods and Results," pp. 94–95 of the Macmillan edition, 1904.

their employment, as axioms of physical philosophy, lies in the circumstance that expectations logically based upon them are verified, or, at any rate, not contradicted, whenever they can be tested by experience.''[4] If Huxley is at times dogmatic, his dogmatism is only his resolute purpose to remain consistent with his postulates so long as ''expectations logically based upon them are verified, or at any rate, not contradicted'' by experience. His obstinate attempt to reconcile the appearance of consciousness in connection with physical changes in the brain with the law of the conservation of energy was not due to any conviction of the logical necessity of that law. His interpretation of the logical basis of that law was exactly the same as that given by Clerk Maxwell himself, who said: ''This doctrine, considered as a deduction [induction?] from observation and experiment can, of course, assert no more than that no instance of a non-conservative system has hitherto been discovered. As a scientific or science-producing doctrine, however, it is always acquiring additional credibility from the constantly increasing number of deductions which have been drawn from it, and which are found in all cases to be verified by experiment. . . . When once apprehended it furnishes to the physical inquirer a principle on which he may hang every known law relating to physical actions, and by which he may be put in the way to discover the relations of such actions in new branches of science.''[5] Huxley believes that the law is true, and he believes this because the assumption that it is true has enabled the scientist to discover more truth.

The second observation has to do with the meaning of causation as Huxley used this conception. ''Another postulate is the universality of the law of causation; that nothing happens without a cause (that is, a necessary precedent condition), and that the state of the physical universe, at any given moment, is the consequence of its state at any preceding moment.''[6] Again, in another work, he says:

[4] *Op. cit.*, pp. 60–61.

[5] "Matter and Motion," chapter V.

[6] *Op. cit.*, pp. 60–61. The only word that need give us pause in trying to understand this statement of his meaning of causation is the word "necessary." This pause is necessitated in view of the fact that elsewhere he "repudiates and anathematizes the intruder." "Fact I know; and Law I know; but what is this Necessity, save an empty shadow of my own mind's throwing?" ("On the Physical Basis of Life," *op. cit.*, p. 161.) It is evident to a careful reader that Huxley believes in necessity and disbelieves in Necessity. The former is only the synonym for invariability. The latter is a "most gratuitously invented bugbear," whose nature Huxley does not exactly define, although he writes of it as if it were a supposititious monster which, it is alleged, prevents men always from doing what they like; and of course being a man who had often experienced the satisfaction of doing what he liked, he was naturally inclined to believe this monster to be a myth.

"For that relation [of cause and effect] is nothing but an order of succession, which, so far as our experience goes, is invariable; and it is obvious that the nature of phenomena has nothing to do with their order. . . . The only meaning of the law of causation, in the physical world, is that it generalises universal experience of the order of that world."[7] Whatever one may think of Huxley's refusal to define causation as anything but an invariable order of succession, one at least may not deny him the right to use this definition of the term if he consistently abides by it. Now it is clear that if by causation be meant nothing but invariable order of succession, something else than invariable order of succession is not causation. Now the law of the conservation of energy formulates a relation which is something else than that of invariable succession. This relation is that of quantitative equivalence of energy among physical phenomena which are in the invariable order of succession. The law of conservation is not a deduction or corollary from the law of causation, but is the statement of a further relation between physical events, with which the law of causation is compatible, but which can not be logically inferred from that law. Again, inasmuch as the law of the conservation of energy is a law that is based on observed physical sequences and only on observed physical sequences, and is in its very terms applicable to physical sequences alone, the fact that there is an energetic equivalence between physical cause and physical effect does not preclude the possibility that always following *certain* physical events there are events that are not physical. If such prove on empirical evidence to be the case, the invariable non-physical sequent upon such a physical event does not invalidate the empirical law of the conservation of energy. The latter law may hold good of the physical members of the sequence, and if it does the presence of a further relation in addition to the energetic-conservation relation is simply an illustration of the fact with which we are familiar in other cases, the fact, namely, that the same term may stand in several relations, and that one relation does not always suffer modification from the presence of another relation.[8] A brain process may therefore have two effects, one a physical effect, exhibiting an equivalence of energy with its cause, and another a non-physical effect and, because non-physical, having no energetic relation to its cause. The absence of the energetic relation in the latter case does

[7] "Hume," New York, 1879, p. 182. I take it that Huxley means, when he says that the nature of phenomena has nothing to do with their order, that one can not argue *a priori* from the former to the latter.

[8] For instance, the relation of equality between two twos is not impaired by the presence of further relations of likeness or unlikeness that may obtain among the four objects severally.

not necessarily carry with it the absence of the relation of invariable antecedence and consequence, that is, the absence of the causal relation as Huxley defines it. Assuming, therefore, the facts of the relation between brain states and later brain states, on the one hand, and the relation between brain states and later conscious processes, on the other, to be what Huxley thought they were, Huxley was perfectly justified in insisting that the conscious processes should not be "interpolated in the series of physical transformations." On the other hand, he was perfectly justified—on the same assumption—in asserting that the conscious processes are the effects of the brain changes. And he was justified, further, in indignantly repudiating the charge that such an assertion committed him to materialism. The recognition that the psychic is the effect of the physical commits no one to a materialistic interpretation of the psychic, unless he commits himself to the doctrine that physical causes can have *only* physical effects. Such a doctrine is at best an assumption, and no one who makes that assumption is justified in thrusting it upon others who prefer the assumption that "molecular changes in the brain are the causes of all the states of consciousness of brutes."[9] While it is true that no one has ever observed molecular changes in the brain immediately preceding conscious processes, we have very good indirect evidence that such changes do precede conscious processes, and in view of such evidence we have the right, in absence of empirical confutation, to assume that such sequences are invariable. And this justifiable assumption is nothing but the assumption of a causal connection between body and mind, when causal connection is defined as Huxley defines it. One may not choose to make this assumption, but in the present condition of our knowledge in this matter, one can not justify this refusal on the ground that any empirically ascertained facts preclude it.[10]

My conclusion, so far, is that Huxley was warranted in assuming that the psychic is the effect of physical changes in the brain, and in maintaining that this assumption does not prejudice the assumption of a quantitative equivalence of energy in the successive brain changes. But unfortunately Huxley was not satisfied with leaving matters here, nor did he draw the proper logical conclusion from these assumptions. He went on, in defiance of logic, to deny that the psychic can be the cause of brain changes.

That this is sheer inconsistency can best be brought out by using symbols to designate the physical and the psychic processes involved.

[9] "On the Hypothesis that Animals are Automata," *op. cit.*, pp. 239–40.

[10] It is not possible here to make good this statement by examining all the arguments for interactionism that are based on empirical grounds, hence this statement must be left in its apparent dogmaticalness.

Let us designate the physical processes by the first letters of the alphabet in capitals, and the psychic by the last letters in lower case. We have then the formula

$$\begin{array}{ccccccccc} A & \rightarrow & B & \rightarrow & C & \rightarrow & D & \rightarrow & E \\ & \searrow & & \searrow & & \searrow & & & \\ & & x & & y & & z & & \end{array}$$

where the arrows point from cause to effect, according to Huxley's assumption of the causal relations obtaining. Now if both B and x invariably follow A, and if both C and y invariably follow B, then C invariably follows x. x can not be the invariable accompaniment of B in following A without being the invariable antecedent of C which invariably follows B. To put it otherwise, C can not stand in the order of uniform succession to B without also standing in that same order to what is uniformly simultaneous with B. On Huxley's assumption, therefore, x is "a necessary precedent condition" of C; but by the same token it is the cause of C, in Huxley's phraseology. To borrow Huxley's own language we may say that if it is experimentally certain that a particular molecular motion does give rise to consciousness, it is just as certain that consciousness gives rise to the next following molecular motion; but the how and why of the process are just as inexplicable as in the case of the communication of kinetic energy by impact.[11] If we accept the laws of motion on empirical evidence and assume that in such laws of motion we discover a part of "the rational order which pervades the universe,"[12] on the same evidence we should accept psycho-physical laws, and regard them too as a revelation of the rational order of the universe.

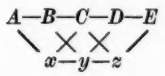
Thus not only is x as well as B the cause of C, but also by the same reasoning is x as well as B the cause of y. In other words, Huxley's assumptions carried out consistently give us three distinct lines of causal connection in the complex series of physical and psychical events. There is the purely physical series of cause and effect; there is the purely psychical series; and there is the psycho-physical series. The first is expressible by our symbols thus: $A—B—C—D—E$, where the lines are lines of causal connection. The second is expressible thus: $x—y—z$. The third to be fully expressed must be written partly in chiastic fashion:

$$\begin{array}{ccccccccc} A & & B & & C & & D & & E \\ & \diagdown & & \times & & \times & & \diagup & \\ & & x & & y & & z & & \end{array}$$

[11] This last reservation merely means that no amount of poring over any term taken in complete abstraction from the actual relations in which it appears will enable us to understand in what relations it appears.

[12] *Op. cit.*, p. 60. I presume that by rational order he means order which makes possible the verification of expectations logically based on the assumption of that order.

Each series is, on Huxley's assumptions logically carried out, a causal series; but not any one of them excludes the other. Each is an abstraction from the whole complex of series; but the abstraction is not a falsification; it does not have to be corrected, but merely to be supplemented by the other two series. The whole complex of series can be symbolized in this fashion:



But the fact that y has a psychical cause is no evidence that x has one, any more than the fact that some brain states have psychic effects is a proof that all physical processes have psychic effects. It is simply a question of fact what events have what causes and what effects. According to the assumption of "the objective existence of a material world," the physical series extends forward and backward beyond the shorter psychical series. But when the psychic emerges its connection with the particular physical events which condition it, and which it conditions, respectively, is not a purely fortuitous connection. Its invariability of occurrence under these physical conditions, and the invariability of the occurrence of the following physical events upon the preceding psychic event, are, to use Huxley's phrase again, part of "the rational order which pervades the universe." The psychic, where it appears, is as integral a part of the universe as the physical. It is only physically epiphenomenalistic: that is, when we are considering *only* the physical connections, the psychic does not enter into account as an object of consideration. The epiphenomenality of the psychic is nothing but its *irrelevance to the task of the physicist,* which is the problem of tracing the purely physical connections. This irrelevance is not a symptom of an intrusion of the psychic into a universe where it does not belong, and where it stays only on sufferance. Belonging to that universe in which it is born, it has its lawful place and lawful connections, and more can not be said for the physical, except that the latter is more pervasive. It is only a metaphysics that recognizes the right of primogeniture, which can exclude mind from membership in the constitution of the universe.

In criticism of the above position it will probably be urged that x can not be the cause of C, because C could happen if B were given without x. The simplest reply to such a criticism is that it ignores the assumption of the view it criticizes. *If* we never have C without both B and x immediately preceding, what right have we to say that we can dispense with x and yet get C, because B would still remain? The only empirical way in which we can determine whether any antecedent is dispensable is to eliminate it and see what happens.

But if we can never experimentally eliminate one of the antecedents of an event, we have no empirical warrant for denying the causality of that event. The fact that certain other physical changes, such as the fall of a stone, can take place without consciousness is no proof that the specific brain change that immediately follows a specific volition could have occurred without that volition. It is true that according to the assumptions of physical science, given *B, C* follows, and this assumption is made without reference to the presence of *x*. But the fact that this assumption does not take into consideration the presence of *x* along with *B* does not force one, *when one does take account of x,* to say that *x* is dispensable. If one does take *x* into the reckoning, that is, if one transcends the purely physical view of the situation, then one should apply to *x* the same conception of causation[13] as is applied to *B*. One should not blow hot on an invariable physical antecedent and cold on an invariable psychical antecedent. However, the fact that *x* is thus to be recognized as a cause of *C* does not warrant one, on Huxley's assumption, in saying that the presence of *x* makes *C* different from what would have followed if *B* had been alone. For the assumptions under which he works preclude the possibility that *B* could be alone; inasmuch as he assumes that *invariably* following *A* are *both B* and *x*. One can not make such an assumption and while still clinging to it also assume that *B* can appear *without x* in sequence upon *A*. If we grant, on the other hand, that *B* could appear without *x* after *A,* then we must deny that *x* is the effect of *A* in Huxley's sense of the word effect; for then *x* would not be an invariable sequent upon *A*. To do otherwise would be like trying to answer the old puzzle: what would happen if an irresistible force were to act upon an immovable body? The answer of course is that the assumption of an irresistible force contradicts the assumption of an immovable body. In the same way it has been asked what would be the bearing upon its own truth of the supposed truth of the statement that all statements are false. The reply is that from an inconsistent statement it is difficult to see how consistent conclusions can consistently be drawn. So when one assumes that *x* always accompanies *B* and that both *x* and *B* always precede *C,* it is difficult to see how one can further assume that *B* without *x* is always followed by *C*. *B* can not always be accompanied by *x,* and also sometimes be by itself. The former assumption may be incorrect, but if it is correct the

[13] This presupposes that by cause is meant an invariable antecedent condition. If cause is defined otherwise, then the question arises whether that conception is applicable to what is psychic, and it may be applied only if applicable. For instance, one may choose to define cause as an invariable *physical* antecedent, and thus by definition rule out the psychic as cause. But if this is done, one should also rule out the psychic as effect.

latter is precluded. Now as a matter of fact we have about as much evidence that the stimulation in a certain way of a normal optic nerve under certain brain conditions is always followed by a certain "conscious process" as we have for believing that it is also always followed by a definite change in brain conditions. It is hard, therefore, to see how, in our present state of knowledge, one can justify oneself on empirical grounds in denying the propriety of making the assumption that both x and B always follow upon A. If this assumption is made, then, I submit, one is logically bound to regard x as well as B as the cause of C; and, again I submit, one is logically bound to assume further that C never occurs without the prior occurrence of x as well as of B.

But, again, the assumption that x is an indispensable antecedent of C does not commit one to denying that all the energy of C is found in B, and that all the physical characteristics of C are physically accounted for by B. For by physically accounting for any event is only meant, on Huxley's assumptions, stating all the necessary antecedent *physical* conditions of that event. This can be done and must be done, if done at all, by completely ignoring everything antecedent that is *not* physical. When one turns to the consideration of the non-physical antecedents of the event, if it has any, one must refuse, because these antecedents are non-physical, to impute to them any physical character, such, for instance, as that they allow some of their energy[14] to pass over into their physical effect: not having energy themselves they can not take part in a transaction in which they could engage only if they had it.

It is now possible to indicate briefly the points in which this view,[15] now developed from Huxley's epiphenomenalism, differs from interactionism and from parallelism and also the points in which it agrees with them. It differs from interactionism in declining, consistently with its own assumptions, to say that B without x would be followed by something else than C; it thus declines not because B without x would still be followed by C, but because, on the assumptions made, B never appears without x. It agrees with interactionism in assuming that C would not have occurred without x. It differs, on the other hand, from parallelism in asserting a causal interrelation between the physical and the psychical where there is evidence that the psychical follows uniformly upon the physical, and

[14] I am using energy here in the sense in which Maxwell uses the term in his "Matter and Motion," not in the sense in which energy is frequently used of will when treated as a purely psychical fact. I am not denying the propriety of the latter use; I think, however, that if it is used in both senses, it is advisable to be distinctly aware of the ambiguity.

[15] If this view requires a name, I should suggest intercausalism as perhaps as appropriate as any.

vice versa; it does this because what it means by causation is invariably uniform sequence. It agrees with parallelism in declining to admit that any physical characteristics of *C* are not completely accounted for physically by *B*, and in declining to admit that a physical account needs to be revised and corrected by a psycho-physical account. Supplementation is not necessarily correction.

One thing further should be said in setting this view right against a possible criticism. The theory of causation adopted in this view, while it may be stated in purely Humian terms, is not necessarily so stated. On the contrary, it is possible to regard relations not as accidentally adventitious in the universe, but as constitutive of it just as much as terms are—just as constitutive of experience as relations are in Kantianism. But while Kantianism is not content with merely recognizing the constitutive character of relations, but proceeds to affirm that all constitutive relations are supplied by the synthetic unity of apperception, this view may regard relations as existing in their own right and not needing any transcendental support. This is the form of the view that appears to me the more tenable, and this seems to be the form of the view, so far as Huxley held it, which he at least at times did hold, as seems to be shown by his speaking of "the rational order which pervades the universe." According to this view the psycho-physical connections and the psychological connections in the universe are just as ultimate and underivative as are the physical connections. The important point is not to assert dogmatically beyond the evidence that any form of connection, because it obtains somewhere, must obtain everywhere.[16]

Before closing this paper it remains to render Huxley a piece of justice that has been generally denied him. In his essay of 1874[17] he declined expressly to recognize the causality of "states of consciousness." His critics have generally failed to state the reasons he gave for this denial. They have usually represented that his reason was the inconceivability of a causal relation in which consciousness is cause and a physical event is effect.[18] This is gross misrepresentation. Huxley did not dogmatize about material causa-

[16] Professor James's chapter, *The One and the Many*, in his "Pragmatism," is an eloquent protest against this kind of dogmatism.

[17] *On the Hypothesis that Animals are Automata*, reprinted in "Methods and Results."

[18] Professor James, "Principles of Psychology," Vol. I., p. 137, for instance, after quoting from Huxley among others to show what the automaton theory is, says: "But one has no right to pull the pall over the psychic half of the subject only, as the automatists do, and to say that *that* causation is unintelligible, whilst in the same breath one dogmatizes about *material* causation as if Hume, Kant, and Lotze had never been born."

tion, nor did he dogmatize about the impossibility of psychic causation. He assumed the former as a postulate; and he gave not a dogmatic reason, but an empirical reason for declining to assume the latter. "Is there any evidence that these states of consciousness may, conversely, cause those molecular changes which give rise to muscular motion? *I see no such evidence.* The frog walks, hops, swims, and goes through his gymnastic performances quite as well without consciousness, and consequently without volition, as with it. . . ."[19] This is obviously an incorrect statement of the facts, but it is not dogmatism. There is no hint here of an *impossibility* of psychic causation; all there is is a statement of an observer that he *finds no evidence* for such causation. We are at liberty to criticize the acuteness of his observation, not his "dogmatism." The excerebrated frog does *not* go through all his gymnastic performances quite so well "without his consciousness as with it." In fact, his consciousness is assumed to be absent because he is now brainless. If we say that he can get along without this assumed consciousness as well as with it, we should also say that he can get along as well without his brain as with it. This Huxley did not seem to have seen, and of course his reasoning here is very bad, and it is, I think, because of this fatal misstep that he failed, in this paper on animal automatism, to work out to its proper conclusion the theory which he had so brilliantly begun. Fortunately, however, he made amends five years later, but his critics have, whether through discretion or ignorance, neglected to mention and welcome his return from the error of his ways. Therefore I take the liberty of commending to their attention the tenth chapter of Huxley's little book on Hume, especially the first six pages of that chapter. There he says: "The only meaning of the law of causation, in the physical world, is, that it generalises universal experience of the order of that world; and if experience shows a similar order to obtain among states of consciousness, the law of causation will properly express that order. That such an order exists, however, is acknowledged by every sane man."[20] He proceeds a little later to quote with approval Hume's assertion: "Ambition, avarice, self-love, vanity, friendship, generosity, public spirit: these passions, mixed in various degrees, and distributed through society, have been, from the beginning of the world, and still are, the source of all the actions and enterprises which have ever been observed among mankind." After several rather long citations from Hume, Huxley asks: "But, if the necessary connexion of our acts with our ideas has always been acknowledged in practice, why the proclivity

[19] *Op. cit.*, p. 240. Italics mine.

[20] "Hume" (New York edition, 1879), pp. 182–3.

of mankind to deny it in words?" He answers this question by again quoting from Hume, and the quotation is too long to reproduce here, but the gist of it is that the denial is due to a strong propensity to believe that causal connection means more than constant conjunction. "But, being once convinced that we know nothing of causation of any kind, than merely the *constant conjunction* of objects, and the consequent *inference* of the mind from one to another, and finding that these two circumstances are universally allowed to have place in voluntary actions, we may be more easily led to own the same necessity common to all causes."[21] Still further on in this same chapter Huxley says: "If a man is found by the police busy with 'jemmy' and dark lantern at a jeweller's shop overnight, the magistrate before whom he is brought the next morning reasons *from those effects to their causes in the fellow's 'burglarious' ideas and volitions, with perfect confidence,* and punishes him accordingly. And it is quite clear that such a proceeding would be grossly unjust, if the links of the logical process were other than necessarily connected together."[22] Huxley evidently shares this confidence with the magistrate, and goes so far as to say that the denial of this causal connection is as much a waste of time as would be the denial of a geometrical truth.

These quotations from Huxley and from Huxley's quotations from Hume show that Huxley did not abide by his denial of causality to psychic events in relation to subsequent bodily actions. It is quite true that he never took up the task of showing how this subsequent concession is reconcilable with his early position, and he gave evidence that in 1892 he had returned to his earlier position.[23]

He never succeeded in reconciling a causal order which "is acknowledged by every sane man" with his epiphenomenalism. It has been the purpose of this paper to show that if epiphenomenalism is interpreted as the physical irrelevance of psychical phenomena, an irrelevance based on the purpose of physics to confine its attention to the merely physical, a reconciliation is feasible. Huxley himself furnished all the essential conceptions necessary to this reconciliation. He merely failed to see the logical relation to each other of these conceptions, and his failure was not due to a dogmatic preconception of the impossibility of thoroughly mutual causal relations between mind and body, but to inaccurate statement of empirical facts.

EVANDER BRADLEY MCGILVARY.

THE UNIVERSITY OF WISCONSIN.

[21] "Hume."

[22] "Hume," p. 190, italics mine.

[23] See his famous last foot-note in his definitive edition of the paper, *On the Physical Basis of Life* (*op. cit.*, p. 163): "Or, to speak more accurately, the physical state of which volition is the expression."

THE CENTRAL TENDENCY OF JUDGMENT

SINCE the work of the early investigators of the time sense the concept of the "indifference point" (I.P.) has played an ever-present rôle in experiments on judgments of magnitude, duration, and intensity. Judgments of time, weight, force, brightness, extent of movement, length, area, size of angles, have all shown the same tendency to gravitate toward a mean magnitude, the result being that stimuli above that point in the objective scale were underestimated and stimuli below overestimated, while the mean magnitude itself was invested with no constant error. This region in the scale, flanked above and below by negative and positive constant errors, was called the indifference point, or more properly the region of indifference.

The tendency has been throughout to infer that the I.P. disclosed in any particular experiment was in some way an absolute quantity and should be found in other experiments on the same quality of stimulus. In this way arose the ideas of a "most favorable extent" (Kramer and Moskiewicz, Jaensch) and a "most favorable time" (Vierordt, Höring, Estel, etc.). Among the investigators of the time sense, since an I.P. was found for every group of intervals employed, grew up the doctrine of periodic I.P.'s, those for regions higher up in the scale being multiples of the I.P.'s found in the experiment in which the shortest intervals were used. Attempts were made to correlate the unit of periodicity with various bodily processes—the swing of the leg, breathing time, pulse beat (Wundt, Münsterberg). All of this speculation passed the criticism of laboratory workers and was incorporated in the general texts as a curious fact, productive of many illusions and constant errors, but the analysis was carried no farther.

In an earlier study[1] the writer undertook an experimental analysis of the phenomenon of the I.P. in judgments of the duration and extent of rectilinear arm movements. The results of this investigation showed conclusively that, with the method of reproduction, the following principles hold.

I. The I.P. is relative,—not absolute. It is a function of the series limits of the stimuli employed. Given the series of magnitudes with which we are to work, we may be quite certain that a region of indifference will occur at about the midpoint of that particular scale.

II. A periodic I.P. can be found within a total series (S) by working with its special sections (A, B and C).

[1] "The Inaccuracy of Movement" (with special reference to constant errors), H. L. Hollingworth, Columbia Contributions, Vol. XVII., No. 3, June, 1909.

III. The same absolute magnitude may be either an I.P., or affected with a positive constant error, or with a negative constant error, according to the particular range or section in which it occurs.

IV. The gradual extension of the series limits is accompanied by a corresponding shift in the region of indifference.

V. No magnitude estimated out of relation to a series or group of which it is a member evinces any considerable constant error.

VI. The phenomenon of the I.P. disappears as the interval between separate judgments is extended. The first disposition is soon dissipated and is no longer adequate to affect the second performance.

VII. In a parallel tabulation of the I.P.'s and the ranges of intervals used in the various time-sense studies the influence of the latter on the magnitude of the I.P. is clearly seen.

VIII. The phenomenon of the I.P. and the so-called positive and negative time errors result from a general law—*the central tendency of judgment.* In all estimates of stimuli belonging to a given range or group we tend to form our judgments around the median value of the series—toward this mean each judgment is shifted by virtue of a mental set corresponding to the particular range in question. This *central tendency* is not a "law of sense memory." It is a law of immediate perception and disappears as the experiment becomes a memory test.

IX. In experiments by the method of reproduction this *central tendency* is reenforced by the law of motor habit.

For an account of the experiments on which these conclusions rest and for detailed exposition of their significance the reader must be referred to the earlier study.

The Present Study

Purpose.—On account of the reenforcing value of the law of motor habit the earlier experiments did not indicate how clearly or in how far the results secured were a function of the method of motor reproduction. In order to support the case completely it should be shown that the same law of judgment is present in experiments into which the method of reproduction does not enter. In order to put the generalization to such a test the following experiments have been made on judgments of the size of squares, by the method of recognition.

Observers.—The observers were all women students in Barnard College with from one and a half to two and a half years of training in psychology. Different observers were used in the two experiments and none of them knew the purpose of the experiment, nor were they familiar with the results of the earlier study.

Material.—The material used in both experiments A and B was the same, the chief differences between the experiments consisting in the way in which the series limits were varied. On a dark gray wall were placed 30 squares of light gray cardboard, ranging in size from 2.5 cm. on a side to 50 cm. and increasing from 2.5 to 7 cm. by increments of 0.5 cm., from 7 to 15 cm. by increments of 1 cm., from 15 to 40 cm. by increments of 2.5 cm., and on to 50 cm. by increments of 5 cm. Each card was numbered in consecutive order. Alongside these standard cards and at the same distance from the observer was an exposure apparatus, by means of which, at proper intervals, the fourteen test cards could be presented one at a time. These test cards varied in size from 3 cm. to 40 cm. on the side, ranging from 3 to 7 cm. by increments of 1 cm., from 7 to 15 cm. by increments of 2 cm., from 15 to 40 cm. by increments of 5 cm.

Procedure.—In each experiment a test card was exposed for 5 seconds. The observer then waited for 5 seconds, the eyes resting meanwhile on a dark screen. She then turned to the standard series and was allowed 5 seconds in which to select a card corresponding in size to the one just exposed and to write its number in her record. A second test card was then exposed, and so on throughout the experiment. By keeping a record of the order in which the test cards were shown, the experimenter was able subsequently to compare the observer's judgment with the actual magnitude. As a result of this method of selection all constant errors due to the law of motor habit in reproduction are eliminated and any error disclosed will be entirely an error of judgment of visual magnitude.

Experiment A

This experiment began with series 3, 4, 5, 6, 7, three trials for each magnitude, in chance order. The smallest card (3) was then dropped and the larger card (9) substituted, and three trials taken in chance order, for each member in the new series 4, 5, 6, 7, 9. In this way the successive series moved up along the total range, dropping at each change its lowest member and including the one next larger than its greatest member. The series, that is to say, always consisted of 5 test cards, and as the experiment progressed, magnitudes were dropped from the lower end and new ones added to the upper end. Ten observers were used, 150 trials being taken on each observer. Table I. gives the C.E. of the 10 observers in terms of the square root of the area—that is, in terms of the length of one side of the square. Each figure is the C.E. resulting from 30 judgments.

TABLE I

GIVES THE C.E. IN CM. OF EACH CARD IN EXPERIMENT A.
10 OBSERVERS, 1,500 TRIALS

	3	4	5	6	7	9	11	13	15	20	25	30	35	40
1	0	—.13	—.23	—.24	—.21									
2		+.15	+.52	+.53	—.01	+.44								
3			+.51	+.15	—.11	+.32	+ .31							
4				+.19	+.39	+.55	+ .21	— .02						
5					+.31	+.21	+ .42	— .13	0					
6						+.74	+ .75	+ .64	+ .56	+ .48				
7							+1.31	+ .80	+1.37	+1.73	+2.15			
8								+1.39	+1.60	+1.84	+1.43	+1.92		
9									+ .94	+1.72	+2.15	+ .98	+.90	
10										+2.40	+2.65	+1.50	+.45	+1.78

EXPERIMENT B

This experiment began with the series 3, 4, 5, 6, 7, 9. Three trials for each magnitude were taken in chance order. The next higher magnitude (11) was then added to the series and again 3 trials for each magnitude (3–11) were taken in chance order. At this point the next magnitude (13) was introduced, 3 trials for each card taken, and the process continued until in the ninth series the whole range of test cards from 3 to 40 was included. Six observers were used, 270 records being taken from each observer. Table II. gives the C.E. of the 6 observers for each magnitude in each succeeding series. As in Table I. the errors are given in terms of one side of the square. Each figure in the table is the C.E. of 18 judgments of the same card.

TABLE II

GIVES THE C.E. OF EACH CARD IN EXPERIMENT B.
6 OBSERVERS, 1,620 TRIALS

	3	4	5	6	7	9	11	13	15	20	25	30	35	40
1	.03	.10	.08	.42	.25	.58								
2	.03	.17	.15	.45	.25	.65	.86							
3	.03	.26	.48	.60	.11	.80	.89	.60						
4	.03	.53	.73	.88	.45	.40	.53	.65	1.43					
5	.03	.65	.98	.83	1.05	.43	.36	.52	1.60	2.63				
6	.05	.65	1.05	.78	.85	.72	.43	— .25	1.62	2.05	2.40			
7	.03	.76	1.05	.90	.92	.93	.80	1.00	1.35	1.73	2.25	4.82		
8	.05	.87	1.12	.73	1.23	.70	.82	1.83	1.27	1.77	1.63	1.85	3.08	
9	.08	.68	1.08	.87	1.10	.75	.42	.92	1.52	1.57	1.43	.97	2.10	4.42

In each of these experiments we have another case of the gradual extension of series limits, and if the *law of central tendency* is operative, I.P.'s might be expected to occur in each series and gradually to rise in the range as the larger magnitudes are added. The A.E. and its variability are not given in the tables, since only

the C.E. is of interest for the problem in hand. As a matter of fact the phenomenon of the I.P. is concealed in both experiments by a strong positive constant error which comes from a general tendency to overestimation in judgments of square magnitudes. This tendency has been found by other investigators. Woodworth and Thorndike find a positive constant error in estimates of area by a mental standard. Baldwin, Shaw, and Warren find the same tendency in judgments of the size of squares and attribute it to a change in the memory image. This error, however, is irrelevant to the present problem. The important fact is that underneath this ever-present overestimation the *law of central tendency* is also operative, and its presence can be clearly shown by a proper analysis of the figures.

Casual examination of Table I. shows that the positive constant error for any one magnitude increases as the place of the magnitude in the series descends. Thus the — C.E. (— .21) for card 7 in series 1 changes to a decided + C.E. (+ .39, + .31) in series 4 and 5. The + C.E. (+ .31) of card 11 increases to + 1.31 in series 7, and the errors of the other cards undergo in a strikingly uniform way the same transformation. This is a clear indication that in any one series the magnitude is influenced by other magnitudes occurring above and below it and is in every case shifted toward the center of the series. Thus in series 1 card 7 is drawn toward the smaller magnitudes, and its judgment results in a — C.E. In series 5 the same card is drawn toward a higher set of magnitudes and hence acquires a decided + C.E.

The process is clearly shown by an examination of the 6 cards (7 to 20, inclusive) that occurred in all 10 series. Each of these cards occupied, in the course of the experiment, all 5 positions. Thus card II. is in series 3 the largest magnitude; in series 7 it is the lowest; in series 5 it is the central card; while in series 4 and 6 it occupies the intermediate positions on either side of the center. The same, in appropriate series, is true of all 6 cards, from 7 to 20 inclusive. Now if there were no source of error present except the *central tendency of judgment* each card should have theoretically no C.E. when it occurred in the middle of a series, *i. e.*, it should be the I.P. for that series. But, since there is another error present due to the general tendency to overestimation in judgments of square size, the theoretical conditions are not fulfilled, and each card, even when it occurs in the central position, shows an actual + C.E. We may assume, then, that the error shown in this central position is due to the character of the material, and that so far as the *law of central tendency* is concerned it may be considered 0, or what we might call the *normal error*. If the errors of any magnitude in the

successive series from 1–10 be calculated with respect to this *normal error,* the operation of the *law of central tendency* should lead to the following results. As the series progress the relative errors of any magnitude, that is, the deviations of the actual from the *normal errors,* should show an I.P. phenomenon—they should be negative above the normal, zero at the normal, and positive below it. The facts are shown in Table III., in which, for cards 7–20, the error of each card when it occurred in central position is assumed to be *normal.* It will be seen that above the normal the errors are, with a single exception, negative, while below they are, with only three exceptions, positive. The transformation is from a high — value through 0 to a high + value.

TABLE III

7	9	11	13	15	20
—.10	—.11	—.11	—.66	—1.37	—1.32
+.10	—.23	—.21	—.77	— .81	— .11
0	0	0	0	0	0
+.28	—.34	+.33	+.16	+ .23	— .12
+.20	+.19	+.89	+.75	+ .43	+ .68

Thus from any point of view in which the figures may be regarded the *central tendency of judgment* is revealed, working, however, underneath a general tendency to overestimation. This result is confirmed by the results of Experiment B, in which the lower magnitudes were allowed to remain in the series while the higher were being added. The results appear in Table II. Again there is present the positive constant error due to the character of the material, but underneath the *central tendency* is clearly to be seen.

The magnitudes here used fall into three groups. To the first group belong cards 3–9, present in all 9 series, and influenced in judgment by the gradual inclusion of the higher magnitudes 11–40. According to the aforestated law the effect of these higher magnitudes should be to draw the lower cards toward a constantly augmenting center, that is, as the higher cards appear one by one, the central tendency of the respective series rises. The positive errors of cards 3–9 should thus become constantly greater as the experiment proceeds. Again the deductions are strikingly verified. Thus the error of card 4 increases from + .10 in series 1 to + .68 in series 9; that of 5 from + .08 in series 1 to + 1.08 in series 9, etc. This effect is due, in any one series, partly to the introduction of still higher magnitudes, partly to habituation to the larger cards already introduced and now being repeated.

The second group of magnitudes consists of cards 20 to 40 inclusive. When any one of these cards, say 20, is introduced, the

observer is already considerably adapted to the lower magnitudes, and as the next higher card (25) is introduced in the following series this adaptation to the lower cards is much furthered by the fact that each of the 9 cards below 20 is again repeated three times, while adaptation to magnitudes higher than 20 is only slightly begun by the threefold repetition of card 25. The consequence is that as the experiment proceeds habituation to the lower range increases much more rapidly, at first, than that to the upper range, on account of the greater number of lower cards. In this group, then, we should expect transformations just the reverse of those in group I., that is, the + C.E.'s should become constantly smaller as the high card is drawn more and more in judgment toward the center of the series. Again expectation is confirmed. The error of card 20 falls from + 2.63 in series 5 to +1.57 in series 9; that of card 25 from + 2.40 to + 1.43; that of card 30 from + 4.82 to + .97; and that of card 35 from + 3.08 to + 2.10.

There remain yet to be considered the three cards 11, 13, and 15, comprising group three. This group, standing as it does midway between groups one and two, which show directly opposite transformations, might be expected to show either of two results. First, the two tendencies might neutralize each other, the errors in group three remaining approximately constant or varying irregularly. Second, the first tendency might operate in the first few series, after which, by virtue of increasing habituation to the larger cards the second tendency might begin to assert itself in the later series. So far as the figures go they are sufficiently irregular to admit of either interpretation. There is neither uniform increase nor decrease throughout. There is, in fact, a strong suggestion of the second possible result—initial decrease followed by increase as habituation to higher magnitudes grows. Thus the errors of card 11 fall from + .86 in series 2 to + .36 in series 5, then increase to + .80 and + .82 in later series. Card 13 falls from + .60 in series 1 to − .25 in series 6, then increases to over + 1.00 in series 7–9. Card 15 falls to + 1.35 in series 7, increasing to + 1.50 in the last series.

TABLE IV

	3	4	5	6	7	9
1	−.01	−.42	−.67	−.30	−.44	−.08
2	−.01	−.35	−.60	−.27	−.44	−.01
3	−.01	−.26	−.27	−.12	−.58	+.14
4	−.01	+.01	−.02	+.16	−.24	−.26
5	−.01	+.13	+.23	+.11	+.36	−.23
6	+.01	+.13	+.30	+.06	+.16	+.06
7	−.01	+.24	+.30	+.18	+.23	+.27
8	+.01	+.35	+.37	+.01	+.59	+.04
9	+.04	+.16	+.33	+.15	+.41	+.09

One could scarcely ask for more convincing evidence of the *law of central tendency* than that afforded by the behavior of the C.E.'s in these three groups of magnitudes. The evidence may be reenforced, however, and the process more clearly exhibited by further treatment of the errors in group I., consisting of cards which were present in all 9 series. In the case of this experiment we have no means of determining, as we did in experiment A, the normal error due to the character of the material. We may, however, observe the deviations of the errors in a given series from the average of the errors in the whole 9 series. These deviations should show, as did Table III. for experiment A, an indifference point phenomenon for the errors of any given magnitude in successive series. Such a calculation results in Table IV. As was to be expected, the I.P. phenomenon is clearly present. The successive deviations from the average, in the case of the errors for any given magnitude, pass from pronounced negative direction through an approximate zero point to a pronounced positive direction. This change was caused in every case by the inclusion of higher magnitudes in the series, thus producing an upward shift in the central tendency or median of the series, toward which each lower magnitude was assimilated in greater or less degree, according to the amount of habituation to the upper range.

It is not necessary to go further into the theoretical and interpretative consideration of *the law of central tendency,* since the writer has already discussed this elsewhere.[2] But it should be pointed out that none of the factors usually introduced to explain the occurrence of indifference points are adequate. Unexplained differences in time error (Fechner), mechanical sources of error in apparatus (Schumann), peculiarity of the sense organ (Vierordt), lack of current motor control (Delabarre), relative expenditure of energy (Wundt), change in the memory image (Wreschner, Leuba), fatigue and dynamogeny, all these may contribute their share toward the actual magnitude of a given error, but their influence can hardly be conceived as varying up and down a scale of objective magnitudes in such a way as to account for the shifting I.P. with extension of the series limits.

Nor is the phenomenon in any way the result of contrast. It is, on the contrary, just the reverse—a case of two magnitudes approximating each other in judgment by virtue of their temporal contiguity. The tendency seems explicable only in terms of itself. Just as our experience with a race, class, or social group results in the conception of a *type* which shall in some way represent the central tendency of the group, and from which the separate members shall deviate the

[2] "Inaccuracy of Movement," chapter III.

least, so in an experiment on sensible discrimination we become adapted to the median value of the series, tend to expect it, to assimilate all other values toward it, and to greater or less degree to substitute it for them. Either this tendency is the rudimentary process out of which the higher acts of conception grow, or it is the habit of conception extended to sensory fields and interfering with a quite elementary process of comparison and recognition. The importance of the law in any series of psychophysical measurements should be apparent. The error to which it leads is distinctly an error of judgment, and is quite independent of sensory or physiological conditions which may of themselves be sources of other types of errors.

H. L. HOLLINGWORTH.

COLUMBIA UNIVERSITY.

REVIEWS AND ABSTRACTS OF LITERATURE

The Individual and Reality. An essay touching the first principles of metaphysics. EDWARD DOUGLASS FAUCETT. New York, London, Bombay, Calcutta: Longmans, Green, & Co. 1909. Pp. xxiv + 449.

A work which is hailed by William James "as a great and powerful agency in the spreading of truth" naturally invites attention. The book —modestly called an "essay"—is one more indication, and a striking one, of the strong modern movement toward the fusion, or at least the working combination, of the antithetic streams of thought represented by the terms individuality and continuity. In his "Riddle," published in 1893, the author was a pronounced individualist, championing a thoroughgoing monadology; in the present work the individual, though by no means surrendered or explained away, is abundantly supplied with "doors and windows." It is described as a "center" in an essentially continuous universe; not *the* center, for the outlook is entirely pluralistic; but one of innumerable centers, all of which are open to the tides and pulsations of the cosmos. They are "emphases, foci of intense activity, traveling eddies, as it were, within a MOTHER-STUFF COESSENTIAL WITH OURSELVES." The author's system is thus at once dynamic and objectively idealistic. He calls it a "real-idealism" or an "idealistic dynamism." All existence is alive, differences being purely matters of extent and type of organization.

With his metaphysical interest Mr. Faucett combines a lively concern as to the ethical outlook. He finds no morality whatever in nature, which is fundamentally blindly impulsive and non-rational. Yet there are two fundamental characteristics of existence which render it increasingly amenable to the guidance of mind, and so susceptible of ends of value, or moral outcomes. These are a blind groping toward unimpeded and enlarged activity and a large measure of plasticity; and on the strength of them he holds to a "far-off divine event," toward which

through intelligent control the whole creation may be, and should be, made to move. Meliorism is the cause he maintains over against the false "perfection" of absolutism. In such a scheme the office of mind is evidently a capital one. Consciousness is described as a state of a part of a highly organized, or "major, center." It is that part of the center which, so to speak, shines "in its own light," the "light" being the heightening of function due in part to the center's superior organization, partly to the struggle which always goes on between centers that are in contact when their equilibrium is destroyed, as, for example, in the brain cells under nervous stimuli. This struggle involves mutual "invasions and penetrations." Sensation is the spoil of such an "invasion"; it is the sharing on the part of the "major center" in the subconscious experiences of a multitude of "minor centers" in the cortex, the nerves, etc. It is never complete; the appropriated activities are always partial and confused—the mere surface of the processes involved—so that perception is rather a "show" of reality than an accurate representation of it.

Quite objective as is the book in the main, in its epistemology the writer unfortunately construes his term "center" as though it were a circle, the circumference (*i. e.*, the limit) thereof being the salient feature for thought. Somehow all things are known to be mental facts, though how a characteristic shared by all alike could be distinguished is not suggested. It is laid down as the fundamental proposition, that "*appearances, as aspects of* MY *sentient experience, appear*"—an idealist assumption that presents us with the subject-matter of inquiry all neatly classified and labeled in *advance* of inquiry! It is matter for regret that the author did not keep to the logic of his chosen term "center," make the implied circumference coincide with the ever-expanding confines of the universe of knowledge, and show that the traditional epistemological firmament, which so generally shuts in the idealist, is really open sky, penetrable and penetrated in myriad ways by cosmic activities. It is to be regretted, also, that he did not give more space to the discussion of the evidence for immortality, instead of resting the case on the one principle of persistence of type. To this end some of his argument for palingenesis through a plurality of earthly lives might profitably have been spared. Yet in the main the reader will find much of just discrimination and apt characterization in these well-printed pages with their fresh literary style—for example, his description of the significance of God to the plain man, in the discussion of the "God-who-is-to-be"—much, too, that is suggestive and intellectually stimulating in the way of alert inquiry and up-to-date metaphysical speculation.

COLUMBIA UNIVERSITY. WM. FORBES COOLEY.

L'Evolution, Doctrine de Liberté. F. LEENHARDT. Foyer Solidariste. Saint-Blaise et Roubaix. 1910. Pp. 155.

As the title suggests, this work purports to present the evidence for the conception of evolution as a doctrine of liberty as opposed to that

theory which designates it a doctrine of necessity and materialism. Building upon the results of science, it seeks to harmonize these with the facts of moral life. Part I. is concerned with the conception of evolution necessitated by the examination of the biological sciences. Part II. discusses the nature of ethical evolution, evolution in the moral life of man.

An historical study of the idea of evolution in embryology shows that the first conception of necessary development was modified upon a closer knowledge of the facts, so as to include a factor of initiation, a certain original activity. The realization of a plan in the development of the embryo is in part subordinated to the conditions in which the realization takes place. Embryonic development appears as a repetition, but as a repetition with accidents.

The consideration of the conception of evolution in phylogeny with the assistance paleontology shows the same necessity for positing an element of initiation. The development from a germ as a necessary process, as the realization of a plan must give way in the face of such phenomena as recoils and arrested developments and allow for elements of contingency. Religious tradition is in harmony with the conclusion that there exists a factor in the development of life which may be called liberty. Creatures not only develop organically from within outward, but become one of the factors of their own development.

In response to the objection to the idea of beings deprived of reason taking part in their own creation, the author resorts to a study of certain facts in comparative anatomy considered in their relation to physiology. The order followed in the formation of beings in the past presents a certain parallel to a hierarchy of observed functions. Inferior animals are in direct relation to their environment. The development of a nervous system and the formation of an organ which centralizes something of all the functions of the nervous system permits an activity which is not directly in response to the environment. The preponderance of the hemispheres in vertebrates is significant, since the hemispheres are the organs of activity which may be called spontaneous, that is, not provoked by the exterior environment, but is in response to interior solicitations; in a word, psychic. Paleontological life becomes significant when it is considered as the means to the formation of an organism containing the stored-up and transformed impressions of ages, an organism which is more highly developed, autoactive, an organism which reaches its climax in a being capable of reflective liberty.

Ethical evolution takes its point of departure with the advent of an animal conscious of himself, a personal animal. The dominant trend of this evolution is effort towards independence, towards the formation of an activity conscious of itself and absolutely master of itself, otherwise the moral nature of man. Ethical evolution is the characteristic of the development of humanity as psychical evolution was found to dominate the evolution of mammals. But the evidence tends to show that this evolution is not directed in a straight line, according to a preconceived end, but is marked with discordances and contingency. The powers that man

creates, such as intelligence, science, civilization which should be instruments for self-direction, can be applied to contrary ends. This deviation is seen to possess significance and value when it is viewed as a result of the power of choice in man. It is this liberty which is the source of the origin of the sentiment of responsibility, the characteristic tract of the development of humanity. The future of humanity is uncertain. It may proceed from an abnormal group in such conditions as were created by a man master of himself, Jesus; the contrary is also possible. But the end of terrestrial humanity arises from human liberty.

In conclusion we may say that the work does not appear to offer anything especially new in the way of a contribution. It leaves the problem of the relation of initiation with the mechanical conception untouched. This question may suggest itself as fundamentally involved in the whole investigation.

SAVILLA ALICE ELKUS.

MUNICH.

Théorie des Principes de L'Absolu. HENRY ROULLEAUX DUGAGE. Paris, Plon-Nourrit et C^ie^. 1909. Pp. ix + 58.

This little book is remarkable for the naïve manner in which it handles complex problems and the easy assurance with which it effects the transitions of the argument apparently oblivious of traditional difficulties therein suggested.

It proposes to cast aside every philosophical system and upon the basis of a single certainty, by means of rigorous analysis alone, to deduce the principle of existence, the absolute. It is "an inquiry into the principle which reason must deduce from the first principle of consciousness, considered as the only basis of certitude, in order to conceive itself and the universe." The primary fact which reason necessitates is consciousness, self-consciousness (Je suis). Descartes's error consisted in admitting other original absolutes than this single subjective one. Part I. discusses the principle of knowledge, "Je suis."

Analysis shows that this fact of self-consciousness involves the existence of the universe. "I exist and with me all the universe." Part II. is concerned with the principle of being (That which I am). The notions of time, space, matter and cause, while objective in the sense that thought asserts them, are subjective. They are the points of support, the limits of existence, "which consciousness creates itself in order to conceive itself."

The argument then proceeds to the deduction of a universal consciousness. "To the universal object which each consciousness conceives corresponds the universality of these individual consciousnesses." The laws of nature are the same for all individuals. This fact requires the existence of a universal consciousness. The innumerable beings which compose the universe "are only the emanations of this unique thought." Individual consciousnesses are simply points of view of a single consciousness.

Part III. passes to the deduction of the principle of morality, "That which I am to others." Thought is not only conscious, it is energy and

will. These active individuals can only constitute a whole on condition that they are of the same essence. "The existence of the universe can only be conceived as if a law organized it and morality is at the same time the general principle and the practical rule of this organization." The common principle which is found to be the basis of the morality of all civilizations is that of the solidarity of individuals. "The consciousness of this unity of being is the basis of morality." Altruism is the source of human progress.

After a perusal of the book one is impressed with the idea that the ethical ideal sketched in the last chapter is the inspiring motive of the work. But however this ideal may appeal to our sympathies, it fails to commend itself as a logical deduction resulting from the analysis of a certainty.

SAVILLA ALICE ELKUS.

MUNICH.

Le sens de l'existence. L. STEIN. Translated by A. CHAZAUD DES GRANGES. Paris. 1909. Pp. xi + 534.

This is a presentation in lively and accurate French of the author's "Sinn des Daseins" which appeared in 1904 and which furnishes an excellent introduction to the later "Philosophische Stroemungen der Gegenwart" (1908). The book is a collection of essays presented in four groups as Metaphysics, Epistemology, Ethics, and Sociology. An excellent abstract of the original appeared in the *Revue de Métaphysique et de Morale,* May, 1905 (Suppl., p. 6).

Metaphysically, the world is a bundle of active forces which the law of causality governs, although it is not a mere mechanism. The energetic theory of matter is close to Ostwald and Mach.

Epistemologically, the ancient world tried to bring reality under the concept of immutable substance, the middle ages under the concept of attributes, the seventeenth century under that of modes, the present, of relations. Now the principle of identity rules consciousness and truth is seen to be the agreement of thought with itself.

Ethically, experience shows us the actual realizing of the better, and the duty of man consists in acting for this end.

Sociologically, we find progress depending on association. Society creates reason. "Plato and Aristotle could not have appeared amongst the Hottentots." But society is becoming less and less tyrannical. At first it ruled by fear, then by faith, now by intelligence. A social hierarchy is necessary and legitimate, but beside the "blue-blood" aristocracy has arisen an aristocracy of wealth, to which is being added an aristocracy of the "knights of labor."

The author's thought is selective rather than creative. Although clear and stimulating in style, the reader feels at times a strangeness in certain historical interpretations—does natural science owe so much to Schelling?—and the criticism of opposing theories are decidedly weak. As the French reviewer remarks—I paraphrase from memory—"is all

pessimism a 'philosophy of the sick,' and can not one fail to believe that the best thing for the world is a Prussian Hegemony that has carried on the labor legislation that figures in the program of Von Bülow without meriting the reproach of "neuropath"?

HAROLD CHAPMAN BROWN.

COLUMBIA UNIVERSITY.

Attention and Interest: A Study in Psychology and Education. FELIX ARNOLD. New York: The Macmillan Co. 1910. Pp. 272.

It is worthy of note that a definite attempt is being made to provide two types of books in psychology and education that are intended to increase the efficiency of the teaching of these subjects. One of these is the elementary text-book for beginners in various phases of the subjects; the other is the monograph on some special topic, designed to provide occasional collateral reading for beginning classes and a convenient handbook for students in advanced classes. This second type of book is represented in Dr. Arnold's "Attention and Interest: A Study in Psychology and Education." This book differs from a thesis in that the aim is not to present the results of a single investigator, but to collate and interpret all the significant results upon the given topic. Although the author has covered the entire fields of attention and interest in a general way, he has specifically aimed "to clarify and arrange the many facts that have been brought to light by numerous experiments in the psychological laboratories."

This book is divided into three parts, viz.: I., Attention; II., Interest; III., Education. The first part includes chapters on The Given Situation in Attention, The Objective Aspect of Attention, The Psychophysical Aspect of Attention, The Physiological Aspect of Attention. The second part discusses The Motor Aspect of Interest and The Ideal Aspect of Interest. The third part is devoted to Attention in the Class-room and Interest in the Class-room.

It seems to the reviewer that it would have been a gain to leave the last two chapters out of the present volume. The purely psychological chapters would have then formed a unity. The two pedagogical chapters occupy only about one ninth of the entire book. In their present contracted form, though very interesting and valuable, they do not show how they are related to the preceding portions of the book. Dr. Arnold is thoroughly qualified to offer us an entire volume on the educational aspects of attention and interest and it is hoped that he will do so in the near future.

This very useful and commendable volume is marred by some oversights in details of editing. Some words are misspelled and some are not spelled uniformly throughout the book. As illustration of this we note in the index "Pryer" for "Preyer." On page 27 "Titchener" is spelled "Tichener" in one place and in another it is spelled correctly. Seashore's initials should be "C. E." instead of "E. C." as given in the index. There seems to be no uniformity in writing the titles of books or magazines. For example, we find one of Titchener's works referred to in the

following ways: Page 27, "*El. Psych. of Feeling and Attention*"; page 27, a few lines remote, "Lectures on the Elementary Psychology of Feeling and Attention." On page 23 it is written as follows: "*Feel. and Attent.*" In some other places it is still different. As another illustration of the same lack of uniformity we note on page 40 in one place "*Psych. Arbeiten.*" and in another "*Psych. Arb.*"

FREDERICK E. BOLTON.

STATE UNIVERSITY OF IOWA.

JOURNALS AND NEW BOOKS

INTERNATIONAL JOURNAL OF ETHICS. April, 1910. *The Reality of the Temporal* (pp. 257–271): J. ROYCE. – The reality of time is the reality of life and action. This reality is not given as a fact of immediate experience, but must be appreciated in an act of will. The time order as a whole is not real at any one temporal instant, but only as a time-inclusive totality or eternally. In its wholeness it constitutes the eternal. *The Ethics of Plato* (pp. 271–281): R. G. BURY. – A brief discussion of the preliminary dialogues, the developed theory of virtue, the good for man, and the personal ideal as exemplified in Socrates. *Ethical Problems of Prison Science* (pp. 281–295): C. R. HENDERSON. – A statement of the chief problems of the science with special reference to the meeting of the International Prison Congress to be held in Washington in October, 1910. *The Appeal to Nature in Morals and Politics* (pp. 295–313): W. J. ROBERTS. – A plea for the exact use of the Stoic conception of a law of nature and a criticism of some historic misuses of the term. *The Sociological Basis of Ethics* (pp. 314–329): C. A. ELWOOD. – Conduct, being activity of social importance, must be based upon social knowledge; a science of the right or wrong of conduct must be based upon sociological knowledge. *Post-Kantian Idealism and the Question of Moral Responsibility* (pp. 329–340): J. W. SCOTT. – The ultimate source of all actions is the whole; but that system constituting function which is our intelligent activity *is* the whole. We are, therefore, the original doers of our actions and ultimately free. *A Study of the Popular Attitude towards Retributive Punishment* (pp. 341–357): F. C. SHARP and M. C. OTTO. – A study of the moral attitudes of one hundred students in the short course in agriculture at the University of Wisconsin. Ninety-two approved, under one condition or another, of the infliction of suffering or loss upon the wrongdoer merely for the sake of producing suffering. *Book Reviews:* Ralph Barton Perry, *The Moral Economy:* J. W. TUFTS. Paul Gaultier, *L'Idéal Moderne:* C. W. SUPER. Gustav Spiller, *Moral Education in Eighteen Countries:* M. L. EASTWOOD. William James, *A Pluralistic Universe:* F. W. HUBBACK. Hugo Münsterberg, *The Eternal Values:* J. A. LEIGHTON. Chas. E. Garman, *Letters, Lectures, and Addresses:* R. B. C. JOHNSON. M. A. Mügge, *Friedrich Nietzsche:* S. WATERLOW. J. A. Hobson, *The Industrial System:* W. J. ROBERTS. William Clarke, *A Collection of His Writings:* GEORGE UNWIN. Edwin A. Bumball, *Jesus and Modern Religion:* NATHANIEL SCHMIDT.

REVUE DE PHILOSOPHIE. February, 1910. *Des droits en concours dans l'œuvre de l'éducation* (pp. 113–132): H. TANDIERE. – The State should engage in the education of the child only in so far as it assists, in its task of education, the family which alone can properly accomplish this task; and in so far as it approves the moral teachings of the church. *Un réaliste peut-il être pragmatiste?* (pp. 133–155): R. JEANNIERE. – A thorough and complete representation of Professor Montague's articles of the same title as they appeared in Vol. VI. of this JOURNAL. *Le réalisme Kantien d'après M. Aloïs Riehl* (pp. 156–167): PIERRE CHARLES. – Riehl, in his *Geschichte der philosophische Kritizismus* shows the insufficiency of the psychological and idealistic interpretations of Kant and insists that as a matter of fact the Kantian philosophy involves the absolute reality of the thing-in-itself. *L'atome necessaire* (*fin*) (pp. 168–182): A. VÉRONNET. – Thermodynamics by no means renders useless the idea of atoms and molecules, but on the contrary gives it a wider application in the explanation of physical transformations. By means of thermodynamics, moreover, we may expect to become as well acquainted with liquid and crystalline molecules as at present in chemistry with gaseous molecules. *Étude sur les théories de la connaissance. II. L'associationnisme* (pp. 183–193): PAUL CHARLES. – The associationalism of J. S. Mill and Herbert Spencer, presented in the first portion of the article may be criticized as follows: (1) It vainly attempts to explain by means of the mental constitution of the observer the necessity and universality of natural laws; (2) the advocates of the doctrine can not cite a single actual case in which association is transformed into belief by virtue of mere repetition. *Analyses et comptes rendus:* W. James, *A Pluralistic Universe.* J. F. Schmidt, *Zur Wiedergeburt des Idealismus:* P. CHARLES. L. Nelson, *Über das sogenannte Erkenntnis-problem:* P. CHARLES. Ch. Lalo, *Les sentiments esthétiques:* L. LÉDA. Sainte Thérése, *Œuvres.* A. Croiset, *Les Démocraties antiques:* T. DE VISAN. H. A. Prichard, *Kant's Theory of Knowledge:* E. BARON. J. B. d'Aurevilly, *J. de Maistre, Blanc de Saint-Bonnet, Lacordaire, Gratry, Caro:* F. PILLON. *L'Année philosophique. Notes bibliographiques. Recension des Revues.*

Coit, Stanton. Woman in Church and State. Ethical Message Series, No. 1. London: West London Ethical Society. 1910. Pp. 70. 6d.

Kelynack, T. N. Ed. Medical Examination of Schools and Scholars. London: P. S. King & Son. 1910. Pp. xvl + 434. 10s. 6d.

Winstedt, E. O. Ed. The Christian Topography of Cosmos Indicopleustes. Cambridge: University Press. 1909. Pp. x + 376 + xiv plates. 12s. 6d.

NOTES AND NEWS

DR. JOSEPH A. LEIGHTON, professor of philosophy and chaplain at Hobart College, has been elected to the chair of philosophy at the Ohio State University, vacant by the retirement from active service of Professor W. H. Scott.